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09/932,050	08/17/2001	Yoshinori Atsumi	09792909-5142	4510

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EXAMINER

DOVE, TRACY MAE

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 10/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/932,050

Applicant(s)

ATSUMI ET AL.

Examiner

Tracy Dove

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,4,14-19 and 22-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4,14-19 and 22-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

This Office Action is in response to the communication filed on 8/3/05. Applicant's arguments have been considered, but are not persuasive. Claims 1, 4, 14-19 and 22-26 are pending.

#### ***Continued Examination Under 37 CFR 1.114.***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/3/05 has been entered.

#### ***Specification***

The amendment filed 12/17/04 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: on page 7 the compound "Ni<sub>2</sub>Si" is not supported by the original disclosure.

Applicant is required to cancel the new matter in the reply to this Office Action.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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Claim 22 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The anode conductive agent "Ni<sub>2</sub>Si" is not described in the specification as filed.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 4, 14-19 and 22-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 4 recite "Li<sub>x</sub>M<sub>y</sub>PO<sub>4</sub>", which is indefinite because "M" is not defined by the claims. Note once "M" is defined, the 35 U.S.C. 112, 1<sup>st</sup>, rejection may be reinstated. Claims 1 and 4 recite a chemical formula Li<sub>x</sub>M<sub>y</sub>PO<sub>4</sub> wherein  $0 < x \leq 2$  and  $1 \leq y \leq 2$ . The recited subscripts may result in an inoperative chemical formula/structure once "M" is defined.

To the extent the claims are understood in view of the 35 U.S.C. 112, 1<sup>st</sup> and 2<sup>nd</sup>, rejections above, note the following prior art rejections.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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Claims 1, 4, 14-19 and 22-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Inamasu, JP 10-312789.

Inamasu teaches a nonaqueous electrolyte secondary battery comprising an active material phosphoric acid compound of the formula  $\text{Li}_x\text{FePO}_4$  (x depends of the valence of Fe) for the positive or negative electrode active material (0007,0011). Note iron has two possible valence states, 2+ or 3+, and phosphate has a 3- charge. Therefore,  $0 \leq x \leq 1$ . The  $\text{Li}_x\text{FePO}_4$  active material has an average grain size (particle diameter) of 0.1-100  $\mu\text{m}$  (0020). Examiner points out that  $\text{Li}_x\text{FePO}_4$  is a preferred compound disclosed by the present specification on page 5. It is important to use a small active material to improve cycle characteristics of the battery (0007). When the phosphoric acid compound is used as the positive active material, the negative active material may be a carbon material such as graphite, lithium or a lithium alloy. Graphite intercalates (dopes) lithium (0018). Lithium metal, lithium alloy and carbon material are all typical materials used for the negative electrode active material of the nonaqueous secondary battery (0002-0004). The electrode materials may be sintered (0023). The nonaqueous electrolyte may include an electrolyte solution comprising an organic solvent (e.g., propylene carbonate) and an electrolyte salt (e.g.,  $\text{LiClO}_4$ ) (0012).

The electrodes may include conductive agents, binders or fillers (0013). The electrodes are configured into a film-like structure (molded body) (0009). The negative electrode may include silicon or germanium ( $t=0$  and  $u=0$ ) (0018). Thus the claims are anticipated.

\*

Claims 4, 19 and 22-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Kamauchi et al., US 5,705,296.

Kamauchi teaches a lithium secondary battery comprising a positive electrode, a negative electrode and an electrolyte wherein the positive electrode is composed of a lithium-cobalt phosphate positive active material. The lithium-cobalt phosphate is preferably  $\text{LiCoPO}_4$  (col. 4, lines 16-19) and the active material may comprise only  $\text{LiCoPO}_4$  (col. 4, lines 32-34). Transition metals besides cobalt such as Ni, Fe, Mn, Cr and V may be contained in the lithium-phosphate positive active material (col. 4, lines 42-44). The negative electrode may be a carbon material doped with lithium ion (col. 6, lines 15-23). The electrolyte comprises an electrolytic salt and a nonaqueous solvent (col. 7, lines 45-60). The positive electrode may comprise at least the lithium-transition metal phosphate active material, an electrical conducting agent and a binder (col. 4, lines 61-65). The mixture is blended and formed into a positive electrode having a desirable shape and size by a known method such as compression molding (col. 5, lines 18-22). The carbon active material of the negative electrode is mixed with a binder and formed into a carbon negative electrode of a desirable shape and size by compression molding (col. 7, lines 40-44). The positive active material has an average particle size of 0.01-20  $\mu\text{m}$  (col. 2, lines 47-66). The carbon material of the negative electrode may be graphite (col. 7, lines 38-39). The electrolyte solution includes a solvent and a salt. The salt may be  $\text{LiClO}_4$  and the solvent may be propylene carbonate (col. 7, lines 45-60).

Thus the claims are anticipated.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamauchi et al., US 5,705,296 in view of Moriguchi et al., US 6,576,369.

Kamauchi teaches a lithium secondary battery comprising a positive electrode, a negative electrode and an electrolyte wherein the positive electrode is composed of a lithium-cobalt phosphate positive active material. The lithium-cobalt phosphate is preferably  $\text{LiCoPO}_4$  (col. 4, lines 16-19) and the active material may comprise only  $\text{LiCoPO}_4$  (col. 4, lines 32-34). Transition metals besides cobalt such as Ni, Fe, Mn, Cr and V may be contained in the lithium-phosphate positive active material (col. 4, lines 42-44). The negative electrode may be a carbon material doped with lithium ion (col. 6, lines 15-23). The electrolyte comprises an electrolytic salt and a nonaqueous solvent (col. 7, lines 45-60). The positive electrode may comprise at least the lithium-transition metal phosphate active material, an electrical conducting agent and a binder (col. 4, lines 61-65). The mixture is blended and formed into a positive electrode having a desirable shape and size by a known method such as compression molding (col. 5, lines 18-22). The carbon active material of the negative electrode is mixed with a binder and formed into a carbon negative electrode of a desirable shape and size by compression molding (col. 7, lines 40-44). The positive active material has an average particle size of 0.01-20  $\mu\text{m}$  (col. 2, lines 47-66). The carbon material of the negative electrode may be graphite (col. 7, lines 38-39). The electrolyte solution includes a solvent and a salt. The salt may be  $\text{LiClO}_4$  and the solvent may be propylene carbonate (col. 7, lines 45-60).

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Kamauchi does not explicitly teach the carbon negative electrode comprises a sintered carbon material.

However, Moriguchi teaches a lithium secondary battery having an anode comprising a graphite (carbon) material. A conventional method is used to produce the negative electrode of Moriguchi. As employed in prior art lithium secondary batteries, a graphite powder is applied to a metal base serving as a current collector with the aid of a suitable binder and is shaped thereon. Alternatively, a sintered electrode may be produced from the graphite powder without use of a binder. Thus, the negative electrode may be comprised predominantly or solely of the graphite powder (col. 15, lines 31-39).

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Moriguchi teaches it is conventional to produce a sintered graphite material anode without use of a binder. One of skill would have been motivated to use a the conventional sintered graphite anode of Moriguchi as the anode for the lithium battery of Kamauchi because the prior art teaches such anodes are well known for use in lithium batteries. Moriguchi teaches both carbon electrodes formed with a binder, taught by Kamauchi, and sintered electrodes (without binder) are conventional methods for forming carbon negative electrodes for lithium batteries.

### ***Response to Arguments***

Applicant's arguments filed 8/3/05 have been fully considered but they are not persuasive.

Applicant argues Inamasu fails to teach a cathode composed of  $\text{Li}_x\text{M}_y\text{PO}_4$  having an olivine structure and having a particle diameter not greater than 1 micrometer and wherein



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$0 < x \leq 2$  and  $1 < y \leq 2$ . However, Inamasu teaches a nonaqueous electrolyte secondary battery comprising an active material phosphoric acid compound of the formula  $\text{Li}_x\text{FePO}_4$  ( $x$  depends of the valence of Fe) for the positive or negative electrode active material (0007,0011). Note iron has two possible valence states, 2+ or 3+, and phosphate has a 3- charge. Therefore,  $0 \leq x \leq 1$ . The  $\text{Li}_x\text{FePO}_4$  active material has an average grain size (particle diameter) of 0.1-100  $\mu\text{m}$  (0020). Examiner points out that  $\text{Li}_x\text{FePO}_4$  is a preferred compound disclosed by the present specification on page 5. It is important to use a small active material to improve cycle characteristics of the battery (0007). Furthermore, the formula  $\text{Li}_x\text{M}_y\text{PO}_4$  is indefinite because “M” is not defined.

Applicant argues Kamauchi fails to teach a cathode composed of  $\text{Li}_x\text{M}_y\text{PO}_4$  having an olivine structure and having a particle diameter not greater than 1 micrometer and wherein  $0 < x \leq 2$  and  $1 < y \leq 2$ . However, Kamauchi teaches a lithium secondary battery comprising a positive electrode comprising a lithium-cobalt phosphate positive active material. The lithium-cobalt phosphate is preferably  $\text{LiCoPO}_4$  (col. 4, lines 16-19) and the active material may comprise only  $\text{LiCoPO}_4$  (col. 4, lines 32-34). The positive electrode may comprise at least the lithium-transition metal phosphate active material, an electrical conducting agent and a binder (col. 4, lines 61-65). The mixture is blended and formed into a positive electrode having desirable shape and size by a known method such as compression molding (col. 5, lines 18-22). The positive active material has an average particle size of 0.01-20  $\mu\text{m}$  (col. 2, lines 47-66). Furthermore, the formula  $\text{Li}_x\text{M}_y\text{PO}_4$  is indefinite because “M” is not defined.

Therefore, Applicant’s arguments regarding the claimed invention are not persuasive.

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***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

**TRACY DOVE**  
**PRIMARY EXAMINER**

  
October 6, 2005